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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,773	06/27/2003	Yoshiyuki Yakabe	8013-1174	6373

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EXAMINER	
HUGHES, DEANDRA M	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,773	YAKABE, YOSHIYUKI	
	Examiner	Art Unit	
	Deandra M Hughes	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-28 and 30-37* is/are rejected.

7)☒ Claim(s) *4 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒* Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/25/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-11, 15-20, 24-28, and 30-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Millar (US 5,453,873 published Sep. 26, 1995).

**The references to the prior art made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

With regard to claim 1, Millar discloses an optical amplifier including:

- an amplifier medium (fig. 1) allowing a propagation of a signal light which is subject to an amplification;
- said amplifier medium being doped with at least one kind of rare-earth ions (fig. 1, ERBIUM), and each of said at least one kind of rare-earth ions having an energy level system which includes:
  - a ground level ($^4I_{15/2}$; col. 1, line 49);
  - a first pair of a laser upper level ($^4I_{9/2}$) and a laser lower level ($^4I_{13/2}$) which is higher than said ground level ($^4I_{15/2}$) and lower than said laser upper level ($^4I_{9/2}$);

- and a second pair of an excited state (PUMP ESA; col. 1, line 60) absorption upper level ($^4S_{3/2}$), and an excited state absorption lower level ($^4I_{11/2}$) which is lower than said excited state absorption upper level ($^4S_{3/2}$);
- wherein said second pair allows absorbing an emission light generated by a transition from said laser upper level ($^4I_{9/2}$) to said laser lower level ($^4I_{13/2}$) (spontaneous emission is inherent; consequently, some photons would inherently transition from $^4I_{9/2}$ and be absorbed at the $^4I_{11/2}$ level);
- and wherein said excited state absorption lower level ($^4I_{11/2}$) is higher than said ground level ($^4I_{15/2}$) and lower than said laser upper level ($^4I_{9/2}$);
- and wherein said excited state absorption lower level ($^4I_{11/2}$) is different from said laser lower level ($^4I_{13/2}$);
- a first excitation generator (801 nm pump; col. 3, lines 30-40) for causing a first type excitation of said at least one kind of rare-earth ions to cause a population inversion between said laser upper level ($^4I_{9/2}$) and said laser lower level ($^4I_{13/2}$) ;
- and a second excitation generator (971nm pump; for causing a second type excitation of said at least one kind of rare-earth ions from said excited state absorption lower level ($^4I_{11/2}$) to a high excited level ($^4F_{7/2}$) which is equal to or higher than said laser upper level ($^4I_{9/2}$).

With regard to claims 6-9, 17-18, and 24, Millar discloses an optical amplifier including an optical fiber waveguide comprising an amplifier medium (e.g., fig. 2, #2), which further comprises a fluorozirconate glass doped with erbium ions (col. 2, lines 8-10) having an energy level system (fig. 1), which includes:

- a ground level ($^4I_{15/2}$);
- a first pair of a laser upper level ($^4I_{9/2}$) and a laser lower level ($^4I_{13/2}$) which is higher than said ground level ($^4I_{15/2}$) and lower than said laser upper level ($^4I_{9/2}$);
- and a second pair of an excited state (PUMP ESA; col. 1, line 60) absorption upper level ($^4S_{3/2}$), and an excited state absorption lower level ($^4I_{11/2}$) which is lower than said excited state absorption upper level ($^4S_{3/2}$);
- wherein said second pair allows absorbing an emission light generated by a transition from said laser upper level ($^4I_{9/2}$) to said laser lower level ($^4I_{13/2}$) (spontaneous emission is inherent; consequently, some photons would inherently transition from $^4I_{9/2}$ and be absorbed at the $^4I_{11/2}$ level);
- and wherein said excited state absorption lower level ($^4I_{11/2}$) is higher than said ground level ($^4I_{15/2}$) and lower than said laser upper level ($^4I_{9/2}$);
- and wherein said excited state absorption lower level ($^4I_{11/2}$) is different from said laser lower level ($^4I_{13/2}$);

- a first excitation generator (801nm pump; col. 3, lines 30-40) for causing a first type excitation of said at least one kind of rare-earth ions to cause a population inversion between said laser upper level ($^4I_{9/2}$) and said laser lower level ($^4I_{13/2}$) ;
- and a second excitation generator (971nm pump; PUMP ESA) for causing a second type excitation of said at least one kind of rare-earth ions from said excited state absorption lower level ($^4I_{11/2}$) to a high excited level ($^4F_{7/2}$) which is equal to or higher than said laser upper level ($^4I_{9/2}$).
- wherein said second type excitation lights are different in wavelength (971nm and 801nm) from said first type excitation lights.

With regard to claim 2, PUMP 971nm excites photons from the ground level to the high excited level.

With regard to claim 3, PUMP 971nm and PUMP 801nm are the excitation generators of two different wavelengths.

With regard to claim 5, the amplifier medium is a waveguide (fig. 2, #2) in the form of a laser.

With regard to claims 10-11 and 19-20, fig. 4 discloses pump wavelengths from 790nm to 815nm. Further, a second pump of 971nm is disclosed in fig. 1.

With regard to claims 15-16 and 25, the claimed dopant concentrations are disclosed (col. 3, lines 50-65).

Claims 26-28 and 30-37 are merely the method of normal operations of the apparatus as claimed in claims 1-3 and 5-11 and 16.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12-14 and 21-23 and rejected under 35 U.S.C. 103(a) as being unpatentable over Millar (US 5,453,873 published Sep. 26, 1995) in view of .

Millar does not specifically disclose a serially connection of a plurality of optical amplifiers. However, Kasamatsu teaches, as is well known in the art, serially coupling optical amplifying fibers (fig. 12). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to serially couple the amplifying fibers for the advantage of amplifying a larger bandwidth.

Allowable Subject Matter

5. Claims 4 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter. The prior art does not teach or make obvious *a plurality of thermally coupled energy levels in the upper and lower laser levels* in conjunction with the other features of the claim.

Information Disclosure Statement

7. The information disclosure statement (IDS) filed on Sept. 25, 2003 has been considered by the examiner and is found to be cumulative to the art of record.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas H Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Deandra M Hughes
Examiner
Art Unit 3663